

**UNITED STATES PATENT APPLICATION**

**OF**

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**FOR**

**SYSTEM AND METHOD FOR REMOTELY  
MONITORING MODEM STATUS**

**Attorney Docket No. 024938-167  
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## 1 Introduction

A need has been identified for the development of diagnostic tools; tools that can monitor multiple modems' configuration and status of CDPD network parameters from a remote location.

This proposal describes a software application that monitors the status of a group of Sierra Wireless CDPD modems. The application (to be referred<sup>1</sup> to as "groupMobile") allows a person to quickly determine if a specific modem is registered and on-line with a carrier. It will also check for basic parameters such as signal strength, channel number and cell number.

If a mobile is not on-line, the person monitoring the group of modems will be notified by an obvious visual indicator.

*groupMobile* can also be used to obtain more detailed information about each modem, similar in operation to WatcherDX.

### 1.1 Scope


This proposal describes the software application's GUI and operation. It does not cover the design implementation or more detailed GUI windows.

### 1.2 Target Customers

The intended customers for this software application include network administrators and technical-support service desks. It is an ideal tool to help SWI customers solve their problems in a shorter period or even prevent them.



The columns represent:

Field	Indicator <sup>2</sup>	Description
Mobile	1..N	Mobile entry index. <sup>3</sup>
Monitor	►, II	Enable/disable monitoring of mobile
ID	"label"	User assigned label: 20 characters long
Last Update	mm/dd/yy hh:mm:ss <sup>4</sup>	Time/Date stamp of last received response
NEI	nnn.nnn.nnn.nnn	Network Entity Identifier
RSSI	-xxx dBm 	Received signal strength indicator: numerical value and graphic
Channel	1..1023	Channel number
Cell #	Xxxxxx	Cell number
SPNI	Xxxxxx	Service Provider Network Identifier
Sleep Enabled	✓, X	Sleep mode indicator.

## 2.2 Operation

Each mobile can be polled for MOB information every  $M$  minutes where  $M$  is from 0 to 60 at .5 minute increments with the default set to 1. If the application does not receive a response to a query within 2 seconds, the application considers the mobile to be off-line or not registered with CDPD network<sup>5</sup>.

The application user will be able to:

- double-click an entry to open a new window. This new window will display detailed information about the selected mobile, i.e., all of the MOB entries. This will work similar to WatcherDX, but use a newly designed window GUI.
- left-click a mobile entry to access its properties: enable/disable mobile monitoring, mobile ID, NEI, add new entry, delete selected entries, move entry, polling rate, etc.
- be notified when a mobile is off-line or not registered with a visual indicator: the entry's background changes from green to red. The corresponding status information will disappear.
- pause the monitoring of specific mobiles. Paused monitoring will be displayed with a gray background.

<sup>2</sup> The icons or symbols are used only to show concept: they may be changed.

<sup>3</sup> The total number of entries  $N$  is to be determined.

<sup>4</sup> Uses standard Window time&date formats.

<sup>5</sup> Provide the ability to set a polling rate for each individual entry. This compensates for mobiles that use sleep-mode and those that should not be polled too often.

### **2.2.1 Logging Feature**

An advanced feature to consider is the ability to log events into a flat text file<sup>6</sup>. It will track, on a per mobile basis, each received MOB response. This can help the user determine when events occur for mobiles with suspected problems.

## **3 Summary**

The primary intention for this application is to help reduce problems in the field by using better diagnostic capabilities. It will be used by system administrators and help-desk personnel. This application is intended to be easy to develop and even easier to use.

The gain to Sierra Wireless is the reduction of support calls, increased customer satisfaction and possibly an aid to the sales of our products<sup>7</sup>.

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<sup>6</sup> With each entry stamped with date and time.

<sup>7</sup> Specifically to customers with fleet deployments such as police departments.

**Background:**

All Sierra Wireless CDPD devices (modems and NIC cards) communicate with their host platforms by exchanging UDP data packets via the serial data link. These packets contain data structures known as Modem Objects and follow a simple request/response protocol.

The MOB packets are used by the host platform such as a PC, to obtain status information of the device (such as RSSI, channel, etc.) as well as CDPD network information (such as cell ID, etc.). The MOB packets are also used to configure various device parameters such as NEIs, side preference, etc.

The MOB packets are sent from the host PC to the device's reserved local IP address 192.0.2.1. The MOB packets are not sent over the air; the device intercepts the requests when the destination IP address is set to 192.0.2.1.

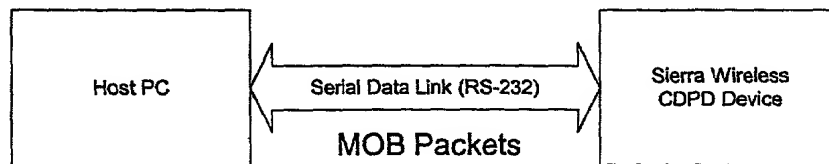


Figure 1: Exchanging status and configuration information between host PC and CDPD device via serial interface.

**New functionality – accessing MOB's remotely over the air:**

A change in the firmware now enables Sierra Wireless CDPD modems to be accessible from any host PC on the Internet. Instead of communicating with the reserved IP address of 192.0.2.1, the host PC must send the MOB packets to the specific NEI (Network Entity Identifier) IP address of the device along with a UDP port number (5678 – default).

The host PC will be able to send requests to the remote device and receive responses.

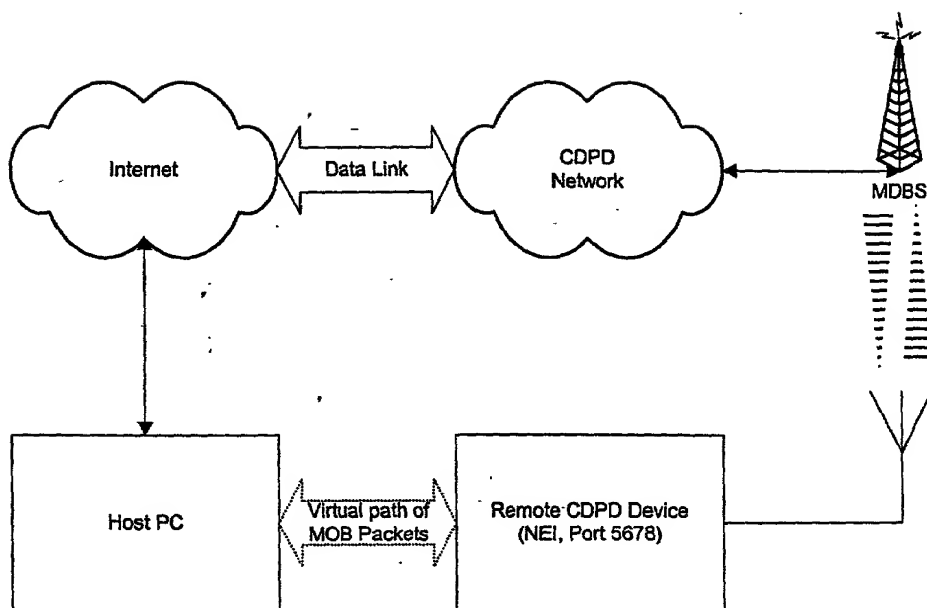


Figure 2: Sending status and configuration information between the host PC and a remote CDPD device over the CDPD network.

**Data Flow:**

- 1) The host PC sends a MOB request in a UDP packet through the Internet with destination address set to the NEI and UDP port set to 5678 (instead of local reserved address or 192.0.2.1)
- 2) The MOB packet travels through the Internet eventually reaching the CDPD network where it forwards the packet to the specified device with IP=NEI.
- 3) The CDPD device intercepts the MOB request (because it checks the IP address and port number), collects the respective data, and returns the information back to the sender via the CDPD network.
- 4) The host PC then receives the response packet.

The remote access feature is implemented by modifying the networking layer (Internet Protocol) in the firmware. There is no need to implement a TCP/IP communication stack in order for this feature to work.